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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,330	03/30/2004	Jong-myeong Lee	5649-1205	5124
20792	7590	11/15/2004	EXAMINER	
MYERS BIGEL SIBLEY & SAJOVEC PO BOX 37428 RALEIGH, NC 27627			EVERHART, CARIDAD	
			ART UNIT	PAPER NUMBER
			2825	

DATE MAILED: 11/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/813,330

Applicant(s)

LEE ET AL.

Examiner

Caridad M. Everhart

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3-30-04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4,6-18, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Ho, et al. (US 6,184,138B1).

Ho, et al disclose the steps of forming a barrier layer in a mold layer in which the mold layer is the dielectric layer. The intaglio pattern in the mold layer is a damascene pattern, which is the same as an intaglio pattern. The barrier layer outside the damascene pattern is removed by forming a spin-on layer such as SOG in the damascene pattern and removing the barrier layer outside of the pattern. A conductive layer of copper is formed and removed from the surface of the mold layer. The damascene pattern is a dual damascene pattern and in Fig. 2 it can be seen that it is formed by the formation of a contact hole and a groove above the contact hole(col. 5, lines 57-62). There is disclosed that the barrier may be Ti/TiN or WN(col. 1, lines 53-58). The flowable spin- on material has etch selectivity with respect to the barrier(col. 6,lines 29-34). The material may be resist(col. 6,lines 12-14). The resist may be partially cured(col. 6,lines 15-20) and removed by wet etch(col. 7, col. 2 of the table and lines 15-20), which is interpreted to be that it may be removed using developer. Ashing may be used to remove the resist(col. 7, col. 2 of the table). The SOG may be removed

using a fluoric acid(col. 7, col. 3 of the table). The metal fill may be aluminum(col. 1, lines 59-62). The conductive layer is planarized by CMP(col. 7,lines 60-65).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ho, et al. as applied to claim 1 above, and further in view of Huang, et al. (US 5,635,423). Ho, et al is silent with respect to the details of the formation of the damascene structure. Huang, et al discloses the sequential formation of a trench and then of a contact opening in the formation of a damascene structure(Fig. 6(a)-6(c)).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the method of forming a damascene structure taught by Huang,

et al in the process taught by Ho, et al because the process taught by Ho et al would also prevent dishing in the damascene structure taught by Huang, et al and because the process for forming damascene structure taught by Huang et al requires few process steps.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ho, et al. as applied to claim 1 above, and further in view of Andideh, et al (US 6,448,185B1). Ho, et al is silent with respect to the details of the formation of the damascene structure. Andideh et al discloses the formation of the contact opening and the formation of a flowable material in the contact opening, and the formation of a trench(Fig. 1c-1g). It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the method taught by Andideh et al with the process taught by Ho, et al in order to form the trench of the dual damascene structure while still protecting the bottom of the contact hole.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 571-272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C. Everhart
11-8-2004


CARIDAD EVERHART
PRIMARY EXAMINER